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PROCESS FOR PRODUCTION OF PRESSURE SENSITIVE RECORDING MEDIUM

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FIG. 1.

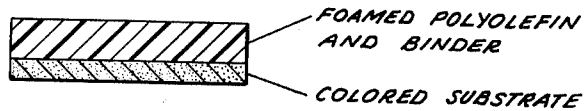
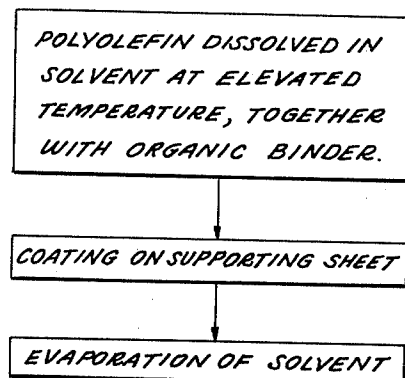


FIG. 2.



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PROCESS FOR PRODUCTION OF PRESSURE SENSITIVE RECORDING MEDIUM

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4 Claims. (Cl. 117-36.7)

It is an object of the present invention to provide a novel recording medium.

It is a further object of the present invention to provide a method for the manufacture of such recording medium.

More particularly it is an object of the present invention to provide a novel recording medium which comprises a supporting sheet coated with an opaque coating, having a color differing from that of the surface coated, and being so constituted that the impact of mechanical force renders the coating translucent in the impacted area.

It is a further object of the present invention to provide such coating which has a foamed structure, which is opaque and which is rendered translucent in the impacted area.

It is a further object of the present invention to provide a convenient method for the manufacture of such recording medium.

Other objects will appear hereinafter.

Hitherto scientific instruments of the recording type have been used with different recording means for recording the data obtained, varying from recording said information in a legible script by means of an inked nib to rather complicated photographic and electrical methods.

The novel medium, according to the invention, comprises a sheet provided with a coating of a color different from that of the surface coated, said coating being so constituted that the application of mechanical force, such as the impact of a typewriter key or stylus, results in a legible mark in the impacted area. Such mechanical force may be applied by means of a pointed implement. On the other hand impact such as by means of a typewriter key, may be resorted to.

A recording medium according to the invention comprises in combination a supporting sheet, such as paper, cardboard, plastic sheeting or the like, coated with an opaque layer of a polymeric substance as defined, having a foamed structure, admixed with a binder for enhancing its adhesion to the supporting sheet, said coating differing in color from the color of the surface coated and so constituted that the impact of mechanical force on said coating renders the coating translucent in the impacted area. A schematic representation of the present novel recording medium is illustrated in FIGURE 1.

The polymeric substance to be used for producing the coating, according to the invention, are preferably polyolefins. Best results were obtained with polyethylene having a molecular weight in the range of between about 3000 and 150,000. According to a preferred embodiment of the invention there is used a supporting sheet having a colored surface, the color of which determines the color of the resulting script or marks. On the other hand a colored coating may be resorted to. Although different organic binders may be used, especially satisfactory results were obtained with natural or synthetic rubber or with polystyrene.

Recording media according to the invention may be used for different purposes. The use in automatic recording instruments is self evident, so is the use of suitably coated thin colored paper for obtaining copies of type-

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written script. Such coated paper may be used for obtaining copies of receipts and the like, written by a ball pen or the like.

It is clear that the thickness of the coating and its sensitivity have to be adapted to the intended use. It is clear that a more sensitive coating has to be used if the recording medium is to be used in a sensitive and delicate scientific recorder than if same has to be used for copies of typewritten script. It has been found that coatings, having a thickness of between 5 and 100 microns, give satisfactory results.

The coating is prepared from a solution obtained by dissolving a polymeric substance, such as polyethylene, in a suitable solvent, such as aromatic hydrocarbons, aliphatic hydrocarbons or halogenated hydrocarbons, if necessary at elevated temperatures, to which there is added a sufficient quantity of organic binder, such as natural or synthetic rubber, polystyrene or the like. This coating is applied to the supporting sheeting by any convenient means, such as brushing, coating or spraying, to result in an even layer of desired thickness. The coating solution contains between about 1% and 10% by weight of the polymeric substance and from about 0.2% to 5% by weight of the organic binder. Although the concentration of the polymeric substance and binder in the solvent has to be adjusted to the intended mode of application, it has been found that generally a 1 to 5% solution of the polymeric substance (by weight) gave satisfactory results. A schematic representation of the process steps for the preparation of the present article is illustrated in FIGURE 2.

The invention is illustrated but not restricted by the following examples:

A sheet of paper having a blue glossy surface is coated on its colored side by means of a solution prepared as follows: 5 grams of polyethylene of molecular weight of about 6000 are introduced into 100 cc. of xylene, heated to a temperature of 65-70° C. and kept at this temperature until the polymer is dissolved. To the hot solution there are added about 10 cc. of 5% solution (by weight) of polystyrene in benzene.

The solution is applied (preferably while still hot) to the colored side of the paper, so as to result in an even layer of about 10-50 microns. Applications by means of brushing or spraying gave equally satisfactory results. After evaporation of the solvent the paper is ready for use.

The thus prepared recording medium gave a clearly legible script when used underneath the original in a typewriter.

The thus prepared recording medium gave a clearly legible script when used underneath the original written upon with a ball pen.

The thus prepared recording medium gave a clearly visible mark when used in an automatic recording instrument, and subjected to the application of pressure by means of a stylus.

Example 2

Paper identical with the one used in Example 1, was coated by brushing with a coating as used in Example 1, to which there was added 0.1% by weight of an aniline dye of red color, soluble in xylene. The resultant coating had a red color, the script a blue one.

Example 3

White cardboard having a smooth surface, was coated with a coating as used in Example 2. The markings obtained were a different shade of red than the color of the coating, clearly visible to the eye.

Example 4

A sheet of paper having a black surface, is coated on the colored side by means of a solution prepared as follows:

A quantity of 3 grams of polypropylene (having a melt index of 1-9, determined by ASTM D1238-52T, and a specific gravity of 0.90-0.91, and commercially available as "Moplen" polypropylene resin from Montecatini Chemical Company) was dissolved in 100 ml. of boiling carbon tetrachloride. After dissolution of the polypropylene a quantity of 10 ml. of a 10% by weight solution of polyisobutylene in high boiling gasoline was added at a temperature of 70° C.

The coating of the paper with the solution was effected at an elevated temperature. After evaporation of the solvent the paper was ready for use.

The thus prepared recording medium gave a clearly visible script when used underneath the original in a typewriter. A number of satisfactory copies could thus be obtained.

The paper was stored for a number of months without deterioration.

Although we have described our invention with a certain degree of particularity, it is understood that the present disclosure has been made by way of example only and that numerous changes in the details of the formulations may be resorted to, without departing from the spirit and the scope of the invention, as claimed herein-after.

We claim:

1. A process for the production of a pressure sensitive recording medium of the auto-copy paper type, which comprises

(a) dissolving a material selected from the group consisting of polyethylene having a molecular weight in the range of from 3,000 to 150,000 and polypropylene having a melt index of 1-9 and a specific gravity of 0.90-0.91, in a solvent selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and halogenated hydrocarbons;

(b) adding an organic binder selected from the group consisting of natural rubber, synthetic rubber and polystyrene thereto, the resulting solution containing from 1% to 10% by weight of said material and from 0.2% to 5% by weight of said organic binder;

(c) applying said solution at an elevated temperature to a supporting sheet; and

(d) permitting said solvent to evaporate to produce an opaque layer adhered to the supporting sheet by said organic binder, said layer having a thickness of from 5 to 100 microns, and possessing a color distinct from that of said supporting sheet.

2. A process for the production of a pressure sensitive recording medium, which comprises

(a) dissolving a material selected from the group consisting of polyethylene having a molecular weight in the range of from 3,000 to 150,000 and polypropylene having a melt index of 1-9 and a specific gravity of 0.90-0.91 in xylene;

(b) adding a solution of an organic binder selected from the group consisting of natural rubber, synthetic rubber and polystyrene thereto, the resulting solution containing from 1% to 10% by weight of said material and from 0.2% to 5% by weight of said organic binder;

(c) applying said solution at an elevated temperature to a supporting sheet; and

(d) permitting the xylene to evaporate to produce an opaque layer adhered to the supporting sheet by said organic binder, said layer having a thickness of from 5 to 100 microns and possessing a color distinct from that of said supporting sheet.

3. A process for the production of a pressure sensitive recording medium which comprises

(a) dissolving a material selected from the group consisting of polyethylene having a molecular weight in the range of from 3,000 to 150,000 and polypropylene having a melt index of 1-9 and a specific gravity of 0.90-0.91, at an elevated temperature in xylene;

(b) dissolving polystyrene in benzene and adding the resulting solution to the solution of said material in xylene, the combined mixture containing from 1% to 10% by weight of said material and from 0.2% to 5% by weight of polystyrene;

(c) applying said mixture at an elevated temperature to a supporting sheet; and

(d) permitting the benzene and xylene to evaporate to produce an opaque layer adhered to the supporting sheet by said polystyrene, said layer having a thickness of from 5 to 100 microns and possessing a color distinct from that of the supporting sheet.

4. A recording medium comprising a supporting sheet coated with an opaque pressure sensitive layer adapted to be rendered translucent in a predetermined area upon the impact of mechanical force in such area, said recording medium having been produced by the process as defined in claim 1.

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